

SECTION 02500 – PAVING AND SURFACING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Scope: This section covers all work involved in the installation of new pavement and the repair and replacement of existing streets, roads, highways, drives, parking areas and other paved areas damaged or destroyed during construction.
- B. New street pavement shall be asphalt only. Any reference to concrete pavement shall apply to the repair and maintenance of existing concrete streets only.
- C. Codes, specifications, and standards referred to by number or title shall form a part of this specification to the extent required by the reference thereto. Except as specifically modified in this specification, paving and surfacing operations, materials and testing will comply with the most current revisions of applicable sections per the latest version of the Indiana Department of Transportation Standard Specifications.
- D. Definitions
 - 1. Abbreviations
 - a. INDOTSS - Indiana Department of Transportation's Standard Specifications.
 - b. AASHTO - American Association of State Highway & Transportation Officials.
 - c. ACI - American Concrete Institute.
 - d. ASTM - American Society for Testing & Materials.
 - e. NRMCA - National Ready Mix Concrete Association.
 - 2. Rock: A natural aggregate of mineral particles connected by strong and permanent cohesive forces. Rock includes limestone, sandstone, dolomite, granite, marble, and lava.
 - 3. Subgrade: The prepared and compacted soil immediately below the pavement or walk system and extending to such depth as will affect the structural design.
 - 4. Subbase: The layer of specified or selected material of designed thickness placed on a subgrade to support a base course and surface course.

5. Base Course: The layer of specified or selected material of designed thickness placed on a subbase to support a intermediate or surface course.
6. **Intermediate** Course: The layer of specified or selected material of designed thickness placed on a base course to support a surface course.
7. Surface Course: The layer of specified or selected material of designed thickness placed on a subbase or base course to support the traffic load.

1.2 QUALITY ASSURANCE

- A. The Developer/Contractor shall employ, at the request of the WPWD or designee, and pay for the services of an independent testing laboratory (unless otherwise noted) to perform specific services and necessary field density tests. The Developer/Contractor shall demonstrate to the WPWD or designee that proper compaction has been obtained and proper asphalt and concrete mix designs are in compliance with the specifications.
 1. Refer to INDOTSS 402.12 for Weather Limitations. Density testing will be required if temperatures conditions are not acceptable.
 2. HMA courses less than 110 lb/sq yd are to be placed when the ambient and surface temperatures are 60°F or above. HMA courses equal to or greater than 110 lb/sq yd but less than 220 220 lb/sq yd are to be placed when the ambient and surface temperatures are 45°F or above. HMA courses equal to or greater than 220 lb/sq yd and HMA curbing are to be placed when the ambient and surface temperatures are 32°F or above. Mixture shall not be placed on a frozen subgrade. However, HMA courses may be placed at lower temperatures, provided the density of the HMA course is in accordance with INDOTSS 402.16.
- B. **Mixing Plant:** Prior to placing any hot asphalt pavement or Portland cement concrete pavement, the Contractor shall provide the WPWD or designee the name and location of the bituminous mixing or concrete mixing plant and the type and composition of mixes the Contractor proposes to use in the work. Mix designs shall be submitted for review and approval a minimum of 5 business days before installation. Any unapproved mix placed by the Contractor shall be removed at no cost to the City of Westfield. There will be no exceptions.

C. Paving and surfacing shall comply with the tolerances specified in Sections 401, 402, 501, and 502 of INDOTSS.

1. Subgrade and subbase shall be within 1/2 inch of dimensions and elevations indicated on drawings.
2. Bituminous base shall not vary longitudinally more than 1/4 inch from a 10-foot straightedge. Bituminous and concrete surfaces shall not vary more than 1/8 inch from a 10-foot straightedge.
3. Finished surface shall be within 1/4 inch of dimensions and elevations indicated on drawings.

D. Asphalt and concrete pavement shall be installed by a contractor whose prime business is asphalt or concrete paving.

1.3 JOB CONDITIONS

- A. Do not place paving and surfacing materials on a wet surface, pumping subbase or when weather conditions would prevent the proper construction of paving and surfacing.
- B. Do not place aggregates on frozen subgrade or subbase. Do not place aggregates when ambient air temperature in the shade is below 35°F. Refer to INDOTSS 301.04 for additional weather limitations.
- C. Bituminous materials are to be placed in accordance with INDOTSS Sections 401, 402, 405, and 406.
- D. Portland Cement Concrete Pavement is to be placed in accordance with INDOTSS Sections 501 and 502.
- E. When air temperatures are at or below 35 degrees F, an admixture is required to be added to the concrete to prevent freezing. Refer to INDOTSS 502.11 for weather limitations. Approval must be given prior to placement by the WPWD Inspector.
- F. Do not place paving and surfacing materials when natural light is not sufficient to properly observe work or operations. Light plants may be required for safety.

1.4 GRADE ADJUSTMENT OF EXISTING STRUCTURES

- A. When a grade adjustment of existing structures is required, the manhole frames, covers and gratings, and the gas and water valve boxes and covers,

shall be removed and reconstructed to grade as required with an approved device. Approved devices include, but not limited to:

1. Concrete riser ring
2. Pro-Ring®
3. Or Approved Equal

- B. Maximum amount of riser rings shall be only 12 inches or no more than 3 rings. Greater adjustment than 12 inches shall require a reconstruction of the structure, per INDOTSS 720.04.
- C. On resurfacing work, the manhole castings and valve boxes shall be adjusted to grade flush with pavement using “Mr. Manhole” or similar approved system after the surface course is installed.

1.5 CONTRACTOR'S ORGANIZATION

- A. The Contractor shall be a firm whose prime business is asphalt or concrete paving. The Contractor shall have a competent supervisor on the site during the progress of the work, acting for the Contractor in all matters concerning the work. He shall have the authority to receive directions and act upon them for the City through the WPWD or designee.
- B. The Contractor shall keep a set of Plans and Specifications available on the site and in good condition.

1.6 TRAFFIC CONTROL

- A. The Developer's Engineer shall plan construction operations so that existing local traffic access can be maintained. If a closure is required, refer to General Requirements, Section 00300.
- B. During the construction, the Contractor will also maintain appropriate use of barricades, lights, flagmen and other protective devices, whether specified for the project or required by the local governing authority. Traffic control devices used for maintenance of traffic shall comply with the latest version of the Indiana Manual on Uniform Traffic Control Devices.
- C. Temporary pavement markings shall be required after milling operations and before resurfacing if left exposed for over 24 hours. Contractor may be required to place cones or approved barricades after temporary markings are pulled and before asphalt is placed.
- D. Temporary pavement markings shall be required after paving operations until permanent markings can be placed, or for the purpose of temporarily

shifting traffic patterns. If permanent markings will not be placed until after the winter season, temporary markings shall be paint or thermoplastic by a qualified contractor.

- E. Asphalt Tapers at all butt joints shall be required if opened to live traffic. Millings are not acceptable.

PART 2 - PRODUCTS

2.1 AGGREGATE

- A. Fine aggregates shall consist of natural sand or manufactured sand produced by crushing rock, shells, air-cooled blast furnace slag, or wetbottom boiler slag.
 - 1. Fine aggregates used in Portland cement concrete and bituminous pavements shall be free from injurious amounts of organic impurities. When subjected to the colorimetric test for organic impurities and a color darker than the standard is produced, it shall be tested for effect of organic impurities on strength of mortar in accordance with AASHTO T 71. If the relative strength at 7 and 28 days, calculated in accordance with section 10 of T 71, is less than 95%, it shall be rejected.
- B. Coarse aggregates shall consist of clean, tough, durable fragments of crushed rock, crushed or uncrushed gravel or shells, or crushed and processed air-cooled blast furnace slag. These materials shall not contain more than 15% flat or elongated pieces and shall not contain particles with an adherent coating. Flat or elongated pieces will be described as pieces having a length in excess of four times its width.
- C. Aggregates shall comply with INDOTSS Section 904.

2.2 BITUMINOUS MATERIALS

- A. Petroleum asphalt cement shall be homogeneous, free from water, and shall not foam when heated to 347°F.
 - 1. Petroleum asphalt cement shall be PG Binder, grade PG 64-22.
 - 2. Petroleum asphalt emulsion shall be AE-60.
- B. Bituminous materials for prime coat shall consist of:
 - 1. Asphalt emulsion - AE-P.
 - 2. Asphalt emulsion – AE-PMP.
 - 3. Prime Coat shall conform to INDOTSS Section 405.

- C. Bituminous materials for tack coat shall consist of:
 - 1. Asphalt emulsion - AE-T, AE-PMT, SS-1h, AE-NT.
 - 2. Tack Coat shall conform to INDOTSS Section 406.
 - a. Type A Cert Required per INDOTSS 406.02.
- D. Bituminous materials for seal coat shall consist of:
 - 1. Asphalt emulsion - RS-2, AE-90, AE-90S, HFRS-2.
 - 2. Materials shall conform to INDOTSS Section 902.
- E. Cover aggregate shall be in accordance with INDOTSS 404.04.
- F. Joint Adhesive shall consist of:
 - 1. Materials shall conform to INDOTSS Section 906.
 - a. Type A Certification Required

2.3 HOT MIX ASPHALT (HMA)

- A. Hot mix asphalt (HMA) shall consist of an intimate mixture of coarse aggregate, fine aggregate (including mineral filler if required), and asphalt cement or emulsion combined in proportions specified in INDOTSS 401. Acceptance shall be in accordance with INDOTSS 402.
- B. When the use of one type or source of aggregate or binder is started, the use of that same type or source shall be continued for the entire lift being constructed, unless otherwise directed by the Engineer.
- C. The use of recycled materials, RAP, shall be permitted per current INDOT standards.
 - 1. No mixes will be approved with RAP exceeding 25.0%
- D. HMA mix design shall be submitted for review and approval a minimum of 5 business days prior to placement of any asphalt.
- E. Preparation of HMA mixtures shall comply with the requirements of INDOTSS Section 402.

2.4 PORTLAND CEMENT CONCRETE

- A. Cement shall be Portland cement and shall meet the requirements of ASTM C 150, ACI 301, and ACI 318. Cement shall be Type 1 for normal use, Type 1A where air entrainment is desired, or Type III or Type IIIA

where high early strength is desired and authorized by the Engineer. Blended hydraulic cements which meet the requirements of ASTM C 595 Type 1P Portland pozzolan cement may be used where a more watertight concrete is required. Fly ash may also be used as a partial cement replacement for Types 1 or 1A in accordance with INDOTSS 502.04. Fly Ash may only be used between April 1 and October 15. Cement shall meet requirements specified in INDOTSS Section 901.

- B. Regular fine and coarse aggregates shall meet the requirements of ASTM C 33. Aggregate shall be crushed limestone with a maximum size of 3/4 inch, except in mass concrete the maximum size may be 1 1/2 inches.
 - 1. Lightweight fine and coarse aggregates shall meet the requirements of ASTM C 330.
 - 2. Insulating fine and coarse aggregates shall meet the requirements of ASTM C 332.
- C. Water shall be potable, clean, and free from injurious amounts of oils, acids, alkalis, organic materials, or other substances that may be deleterious to concrete or steel. A maximum of 500 mg/L of chloride ion may be present in the water.
- D. Air entraining admixtures shall meet the requirements of ASTM C 260.
 - 1. Water reducing and retarding admixtures shall meet the requirements of ASTM C494, Type A or Type D; however, they shall contain no chlorides, be nontoxic after 30 days and compatible with the air entraining admixtures. The amount of admixture added to the concrete shall be in accordance with the manufacturer's requirements. Furnish a compliance statement that the admixture used satisfies all requirements of this specification. Evidence that the admixture is included in the approved list of the INDOTSS Division of Materials and Tests, in accordance with INDOTSS Section 912, will satisfy the requirement for a compliance statement.
 - 2. Fly ash shall meet the chemical and physical requirements of ASTM C 618 for mineral admixture Class F, except loss on ignition shall not exceed 6%. Fly ash shall be sampled and tested in accordance with ASTM C 311 prior to use.

- E. Reinforcing steel shall meet the requirements of ASTM A 615, Grade 60.
 - 1. Welded wire fabric or wire mesh shall meet the requirements of ASTM A 185.
 - 2. Reinforcing steel and appurtenances shall follow INDOTSS Section 910.
- F. Preformed expansion joint filler shall meet the requirements of ASTM D1752, Type III.
 - 1. Hot-poured elastic joint filler shall meet the requirements of ASTM D1190.
 - 2. Waterproof expansion joint filler shall meet the requirements of ASTM D1850.
 - 3. Joint materials specified in INDOTSS Section 906 may be used, approved by the Engineer.
- G. Concrete pavement shall be wet cured by using burlap, waterproof blankets, or ponding; or by using a membrane compound. If the membrane method is used, the compound shall be Type 2, complying with AASHTO M148 for white pigmented compound. A pressure sprayer capable of applying a continuous uniform film to the pavement surfaces will be required.
 - 1. Dowel bars and assemblies shall conform to the requirements of INDOTSS Section 503.
- H. Concrete base shall meet the requirements of INDOTSS Section 305.
- I. Reinforced concrete pavement shall meet the requirements of INDOTSS Section 501.
- J. Reinforced concrete for sidewalks and steps shall meet the requirements of INDOTSS Section 604.
- K. Reinforced concrete for curbing shall meet the requirements of INDOTSS Section 605.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor is responsible to provide equipment, workmanship and materials required to achieve a finished product that meets these specifications.

- B. Compaction equipment shall be in accordance with INDOTSS.
- C. Prior to placing paving and surfacing materials, shape subgrade as required to produce finished pavement grades and cross-sections shown on drawings.
- D. Do not place paving and surfacing material before subgrade is reviewed via proof roll or other approved method and accepted by the WPWD or designee. Do not place paving and surfacing materials on a frozen or muddy subgrade in accordance with INDOTSS Sections 203, 207, 302 and 401, and 402.
- E. Compact subgrade to not less than 100% of its maximum density as determined in accordance with AASHTO T99 and INDOTSS 207.
- F. Provide adequate drainage at all times to prevent water from standing on subgrade, pavement or walks. Sufficient effort shall be made to ensure subgrade is well drained. Mechanical dewatering may not be required.

3.2 SUBGRADE

The subgrade material and testing shall comply with INDOTSS Section 207, before placement of subbase.

3.3 SUBBASE PREPARATION

Subbase shall meet the requirements of INDOTSS Section 302.

3.4 AGGREGATE BASE, SURFACE, OR SHOULDERS

- A. Aggregate base, surface, or shoulders shall consist of crushed rock or gravel. The aggregate type shall be suitable for the area in which the project is located. The aggregate thickness shall be as shown on the drawings and as specified herein.
- B. Aggregate shall be Compacted Aggregate, No. 53, Base in accordance with INDOTSS 301, unless otherwise specified or approved in writing by the WPWD.
- C. If the required thickness of the aggregate section exceeds 6 inches, the material shall be placed and compacted in separate lifts no less than 3 inches nor more than 6 inches of compacted depth.
- D. If spreading devices are used which will ensure proper depth and alignment, forms will not be required; otherwise forms shall be required.

Forms shall be of wood or steel, adequate in depth, straight, of uniform dimensions and equipped with positive means for holding the form ends rigidly together and in line. Segregation of material shall be avoided by any spreading method used. No payment will be made for aggregate placed beyond the dimensions shown on the drawings.

- E. Compact material in each lift after material is spread and shaped. Compact material to not less than 100% of maximum dry density as determined by AASHTO T99 in accordance with INDOTSS 301.06. Use construction procedures, including sufficient moisture adjustments and number of passes, to ensure specified density is attained.
- F. The Contractor shall employ an independent testing laboratory to perform field density tests to demonstrate proper compaction of aggregate surface pavement, if requested by the WPWD or designee.
- G. Unless otherwise shown on the drawings, the minimum section (excluding subgrade) of reinforced concrete shall be 6 inches of Compacted Aggregate, No. 53, Base and 6 inches of 4,000 psi reinforced Class "A" concrete.
- H. Unless otherwise shown on the drawings, for a street with a concrete base and an asphalt surface, the replacement section shall be a new concrete base, not less than 6 inches thick with HMA base to within 1-1/2 inch of the existing grade and then 1-1/2 inch of HMA surface.
- I. Unless otherwise shown on the drawings, chip and seal pavements shall have 8 inches of Compacted Aggregate, No. 53, Base and 1 inch processed bituminous coated aggregate pavement placed and rolled, in accordance with INDOTSS 404.
- J. Unless otherwise shown on the drawings, aggregate pavement shall be replaced with 12 inches of Compacted Aggregate, No. 53 in accordance with INDOTSS 303.

3.5 HOT MIX ASPHALT (HMA)

- A. This work shall consist of constructing one or more courses of HMA base, intermediate, and wedge leveling or surface mixtures on a prepared foundation in accordance with these specifications and in reasonably close conformance with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer.
 - 1. If the required finished depth of any course is to exceed two to four times the top size of the aggregate used as shown by actual screen

analysis, the course shall be constructed in two or more lifts, as directed. Refer to INDOTSS 402 for density requirements.

Mix type shall be as indicated on the drawings, without exception, unless otherwise approved in writing by the WPWD Engineer.

- a. Job mix formulas shall be prepared and submitted for approval in accordance with INDOTSS Section 401. The job mix formula shall include standard bituminous mixture information including, but not limited to, aggregate gradation, binder content, maximum specific gravity, and air voids.
 2. Materials and construction requirements shall comply with the requirements of INDOTSS 401. Acceptance requirements shall be in accordance with INDOTSS 402.
 - B. Place and spread bituminous base mixture with a bituminous paver. In areas inaccessible to a paving machine, place and spread bituminous base mixture by other acceptable mechanical or hand methods.
 - C. Tack coat shall be placed on existing bituminous and/or concrete surfaces before a new lift of bituminous material is added. Apply tack coat uniformly at a minimum rate meeting INDOTSS (0.00025 Tons/SYS).
 1. Patch and clean existing surface. The surface shall be free of irregularities and provide a reasonably smooth and uniform surface to receive the tack coat. Remove and replace unstable corrugated areas with suitable patching materials.
 2. Tack coat shall be placed in accordance with INDOTSS 406.
 - D. Placement and compaction of HMA shall conform to INDOTSS 401.
 - E. Place intermediate or surface used for wedging or leveling, approaches and feathering by mechanical methods or acceptable hand methods for placing and spreading in accordance with INDOTSS 402.
- 3.6 SEAL COAT AND COVERING AGGREGATE (CHIP AND SEAL)
- A. Application shall be per INDOTSS 404.04.
 - B. Seal coat and covering aggregate shall be placed in accordance with INDOTSS Section 404.

3.7 PORTLAND CEMENT CONCRETE PAVEMENT

- A. Portland cement concrete pavement shall consist of a coarse aggregate base (if required) and a reinforced or unreinforced Portland cement concrete surface, as shown on the drawings.
 - 1. Use Compacted Aggregate, No. 53, Base in accordance with INDOTSS 302 for subbase, unless otherwise shown or specified.
 - 2. Pavement cross-section shall be as shown on drawings.
- B. Portland cement concrete pavement operations and materials shall comply with INDOTSS Section 502 unless otherwise specified by the WPWD.
 - 1. Alternate equipment to that specified in INDOTSS Section 502 shall be allowed provided that line, grade, surface, smoothness and other requirements of the specifications are met. The equipment used shall be subject to the approval of a Professional Engineer licensed in the State of Indiana.
 - 2. Expansion and contraction joints shall be installed as indicated on the drawings or as required by INDOTSS 503. Expansion joints shall be required whenever new concrete abuts fixed objects or existing concrete surfaces, whether or not shown on the drawings.
 - 3. Keyway construction, load transfer devices, tie bars and slab and ear reinforcement shall be installed as indicated on the drawings.
 - 4. Unless otherwise shown on the drawings, the final finish of concrete pavement shall be by brooming in accordance with INDOTSS Section 504, to form a transverse skid-resistant finish.
 - 5. The Contractor shall always have materials available to protect the surface of concrete against rain. These materials shall consist of burlap, curing paper or plastic sheeting.
 - 6. New concrete pavement shall be protected by the Contractor until opening to traffic is approved by a Professional Engineer licensed in the State of Indiana. It shall not be opened to traffic until the field-cured concrete has attained a flexural strength of 550 psi, or a compressive strength of 3,500 psi. If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Before opening to traffic, the pavement shall be cleaned and permanent lane markings applied to the pavement.

3.8 TESTING FOR HOT MIX ASPHALT (HMA)

- A. At the discretion of the WPWD the Developer/Contractor shall employ and pay for the services of a competent independent testing laboratory to take cores at selected locations and perform described tests. Compaction requirements for HMA mixtures placed in accordance with INDOTSS Section 401 shall be controlled by in place density determined from cores cut from the compacted pavement in accordance with INDOTSS 402. Cores shall be taken at locations as directed by WPWD Inspector.
- B. The Contractor along with their independent testing lab representative shall obtain cores in the presence of the WPWD with a device that shall produce a uniform 6 inches in diameter pavement sample. Each HMA course shall be cored within one workday of placement. Damaged core(s) shall be discarded and replaced with a core from a nearby location as selected by the Engineer.
- C. The Contractor, in the presence of the WPWD, shall mark the core to define the course to be tested. If the defined area is less than 1.5 times the maximum particle size, the core will be discarded and a core from a new random location will be selected for testing as determined by the Engineer. Within one work day of coring operations the Contractor shall clean, dry, refill and compact the core holes with suitable material approved by the Engineer.
- D. The Contractor's testing lab representative shall take immediate possession of the cores. If the cores are subsequently damaged, additional coring within the specific section(s) will be required at locations to be determined by the WPWD.
- E. Each core shall be tested within one week of coring operation to determine thickness, bulk specific gravity, aggregate gradation and binder content. Test results shall then be transmitted via email or USPS to both the Contractor and the WPWD for verification before each subsequent bituminous lift is placed.
1. Average thickness of the cores shall not vary from the plan thickness more than 0.5 inch for HMA base and intermediate course(s) and 0.25 inch for HMA surface course(s) for acceptance in accordance with INDOTSS Section 105.
 2. The bulk specific gravity shall be determined in accordance with AASHTO T166 or AASHTO T275. The in place density of a section for a mixture shall be expressed as:

$$\text{Density \%} = (\text{BSG/MSG}) * 100$$

where:

BSG = bulk specific gravity as determined from independent testing laboratory

MSG = maximum specific gravity as reported on job mix formula.

3. The calculated density of the cores shall not be less than 92% in accordance with INDOTSS 402. Test results which are outside stated limits shall be considered and adjudicated as a failed material in accordance with INDOTSS Section 105.
- F. The Contractor's independent testing laboratory representative shall determine the aggregate gradation and binder content of the core samples in accordance with ITM 571. Aggregate gradation shall be within tolerances set forth in INDOTSS 401 and binder content shall be within ± 0.5 percent from the job mix formula. Test results which are outside the stated limits shall be considered and adjudicated as a failed material in accordance with INDOTSS Section 105.
- G. A copy of all core test results shall be submitted to the Engineer for verification of specification compliance within one calendar week of core testing.
- H. The Contractor shall make the following tests at their cost and they shall be as specified in this Article and requested by the Engineer. Perform tests in accordance with the following ASTM Specifications:

<u>Test</u>	<u>ASTM Specification</u>
Slump	C143
Air Content	C173
Test Cylinders	C31 or C513
Core Samples	C42
Fly Ash	C311

1. Measure slump each time test beams or cylinders are to be made and at any other time requested by the WPWD. The slump shall be as specified in INDOTSS Section 501, or as otherwise specified herein, unless specifically accepted by the WPWD.
2. Measure air content each time test beams or cylinders are to be made and at any other time requested by the WPWD. The field test may be omitted if the air content is known prior to taking samples. The field test may not be omitted if fly ash is used in the mix.

3. Concrete paving mixes shall comply with guidelines and testing requirements of INDOTSS Section 501. However, in lieu of forming test beams as described in Section 501, the Contractor may substitute cylinder tests as follows:
 - a. Make test cylinders in sets of four. Field cure one cylinder and break at seven days. Laboratory cure the remaining three cylinders and break at 28 days. The Contractor shall be responsible for handling and transportation of cylinders.
 - b. If fly ash is used in the mix, a total set of seven cylinders shall be taken. The additional three cylinders shall be laboratory cured and broken at 56 days, if the 28-day strength does not meet specifications.
 - c. Make one set of test cylinders for each 100 cubic yards, or fraction of 100 cubic yards, of concrete placed; or at other times requested by the WPWD.
 - d. Unless otherwise specified, concrete shall have a 28-day compressive strength of 4,000 psi, as demonstrated by laboratory tests of cylinders.

3.9 PROTECTION

- A. Maintain compacted aggregate subbase and surface true to line and grade and required density. Maintain surface until job is complete.
- B. Do not permit vehicular traffic of any kind on any bituminous course until the bituminous mixture has hardened sufficiently not to be distorted beyond specified tolerances. Remove any foreign material which is on the surface of any course before the course is rolled or any subsequent course is placed.
- C. Do not permit traffic on concrete pavement or sidewalks until concrete has developed sufficient strength not to be marked or damaged. Do not permit vehicular traffic on concrete for at least 14 days.
- D. Repair or replace damaged pavement and sidewalks to the satisfaction of the WPWD or designee.
- E. Asphalt Tapers shall be installed at all butt joints and shall be constructed a maximum grade of 1:8 (12" long for 1-1/2" depth). These tapers shall be sufficiently compacted and maintained until no more than 2 hours before the permanent lift is installed. Millings shall not be used for these tapers.

3.10 CLEANUP

Clean up the job site following pavement and surfacing restoration. Remove all rubbish, excess materials, temporary structures, and equipment. Leave the work in a neat and presentable condition.

3.11 PAVEMENT MARKINGS

- A. Pavement markings are to be in accordance with all applicable standards of INDOTSS Section 808 and MUTCD, unless otherwise noted in WPWD Specifications, herein.
 - 1. All line markings shall be Paint, unless otherwise approved by WPWD.
 - a. Double-yellow spacing shall be 4" Line, 4" Gap, 4" Line
 - 2. All transverse markings and message markings shall be Thermoplastic, unless otherwise approved by WPWD.
- B. Parking lots are to be striped in accordance with INDOTSS Section 808. Spaces to be striped shall be 4 inch wide stripes.
- C. Contractor shall clean the new pavement surface to remove all dust, dirt, mud and debris prior to striping.
- D. Prior to placement of striping, a final walkthrough with the WPWD Inspector shall be conducted on site.

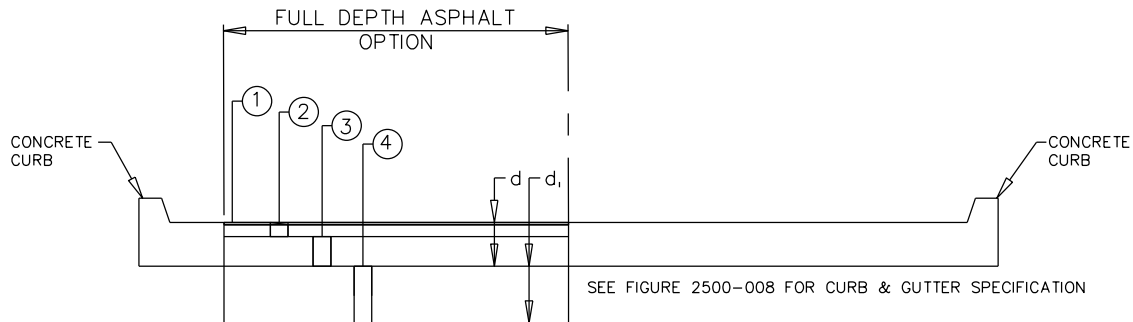
PART 4 - FIGURES

4.1 STANDARD PAVEMENT DETAILS

<u>FIGURE</u>	<u>DESCRIPTION</u>
02500-001	Typical Pavement Section - Local
02500-002	Typical Pavement Section - Collector
02500-003	Typical Pavement Section - Arterial
02500-006	PCCP – Structure Jointing Details
02500-008	Curb Details
02500-009	Underdrain Details
02500-009a	Underdrain Details
02500-010	Sidewalk Details

02500-011	Sidewalk Curb Ramp Notes
02500-012	Cul-de-sac Details
02500-013	Temporary Cul-de-sac Details
02500-014	End of Roadway Details
02500-015a	Street Sign Material Details
02500-015b	Street Name Sign Details
02500-015c	Street Name Sign Details
02500-015d	Regulatory Sign Details
02500-017	Typical Driveway Section
02500-019	Pavement Patching Details
02500-020	Paving Details – New Residential Sections

END OF SECTION 02500



LOCAL STREETS

	ASPHALT 1 d=10.5" d _i =14" d+d _i =24.5"	ASPHALT 2 d=10.5" d _i =12" d+d _i =22.5"
1	1.5" SURFACE 9.5 mm	1.5" SURFACE 9.5 mm
2	3" INTERM. 19 mm	3" INTERM. 19 mm
3	6" COMP. AGGR. (SIZE No. 53)	6" COMP. AGGR. (SIZE No. 53)
4	SUBGRADE TRMT. * TYPE IB	SUBGRADE TRMT. TYPE IC

NOTE:

* CHEMICAL MODIFICATION SHALL BE IN ACCORDANCE WITH INDOTSS 215 AND 913.

TYPICAL PAVEMENT SECTION – LOCAL

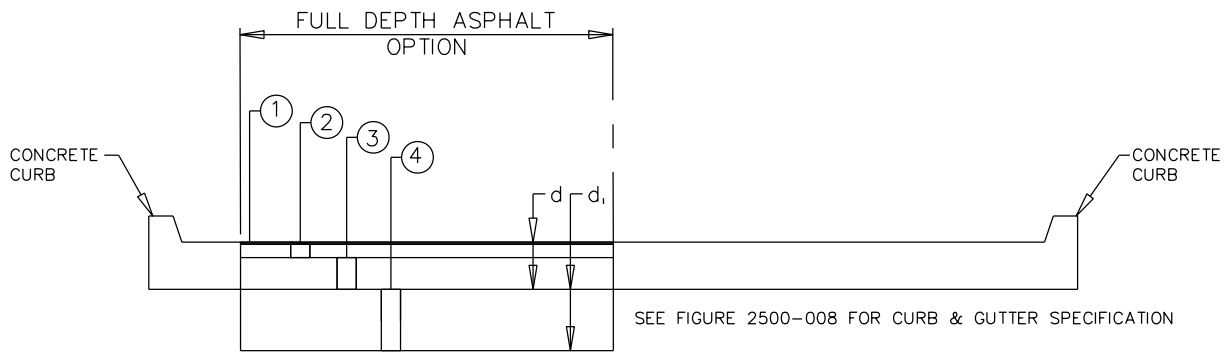
CITY OF WESTFIELD, INDIANA



Phillip A. Sundling

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DATE

FIGURE 2500-001



COLLECTOR STREETS

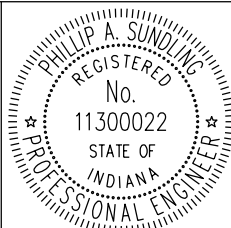
	ASPHALT 1 $d=7.5"$ $d_i=14"$ $d+d_i=21.5"$	ASPHALT 2 $d=12.5"$ $d_i=14"$ $d+d_i=26.5"$
1	1.5" SURFACE 9.5 mm	1.5" SURFACE 9.5 mm
2	2.5" INTERM. 19 mm	2.5" INTERM. 19 mm
3	3.5" BASE 19 mm	2.5" BINDER 19 mm
4	SUBGRADE TRMT. * TYPE IB OR IC	6" COMP. AGGR. (SIZE No. 53)
5		SUBGRADE TRMT. * TYPE IB OR IC

NOTE:

- * CHEMICAL MODIFICATION SHALL BE IN ACCORDANCE WITH INDOTSS 215 AND 913.

TYPICAL PAVEMENT SECTION – COLLECTOR

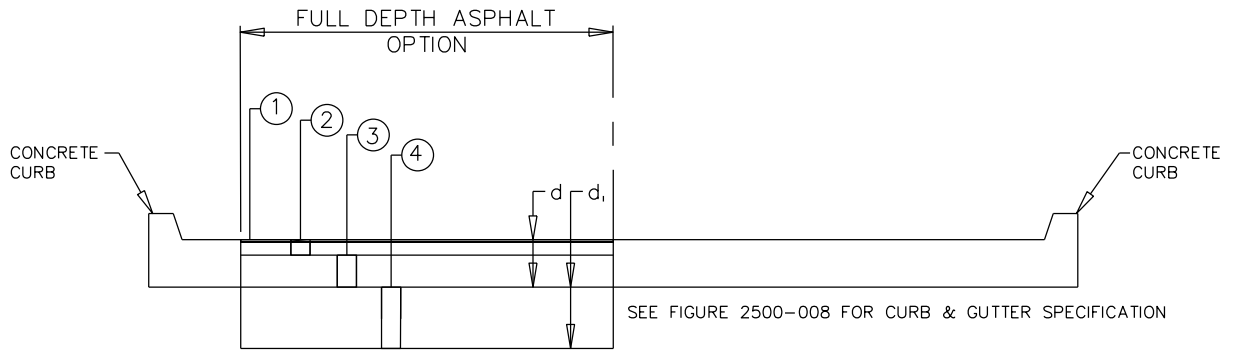
CITY OF WESTFIELD, INDIANA



Phillip A. Sundling

2/26/16
DATE

FIGURE 2500-002



INDUSTRIAL AND ARTERIAL

	ASPHALT 1 d=10" d _i =14" d+d _i =24"	ASPHALT 2 d=15" d _i =14" d+d _i =29"
1	1.5" SURFACE 9.5 mm	1.5" SURFACE 9.5 mm
2	2.5" INTERM. 19 mm	2.5" INTERM. 19 mm
3	2.5" BASE 19 mm	5.0" BASE 25 mm
4	3.5" BASE 19 mm	6" COMP. AGGR. (SIZE No. 53)
5	SUBGRADE TRMT. * TYPE IB OR IC	SUBGRADE TRMT. * TYPE IB OR IC

NOTE:

- * CHEMICAL MODIFICATION SHALL BE IN ACCORDANCE WITH INDOTSS 215 AND 913.

TYPICAL PAVEMENT SECTION – ARTERIAL

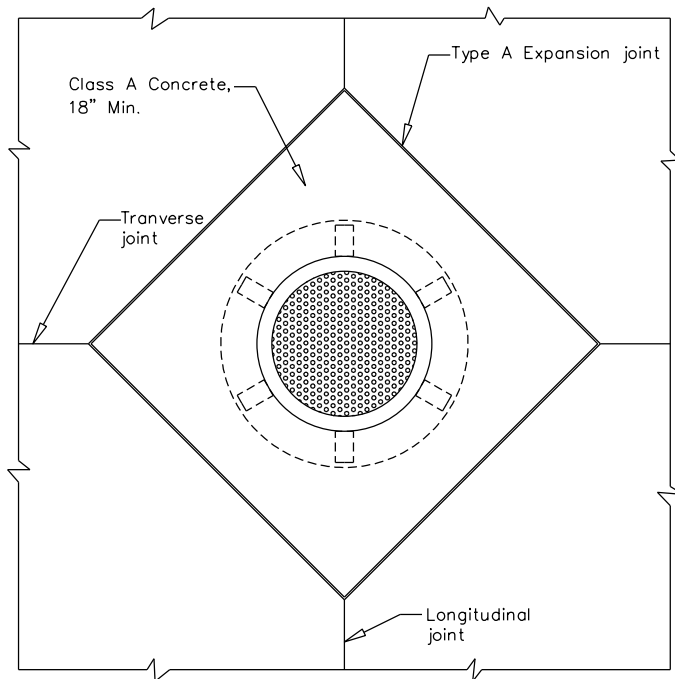
CITY OF WESTFIELD, INDIANA



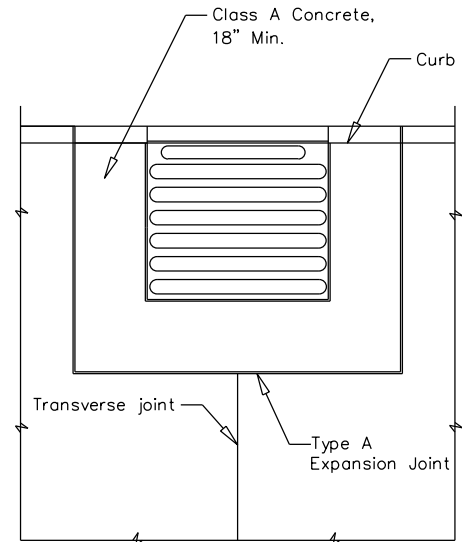
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FIGURE 2500-003



Manhole Boxout

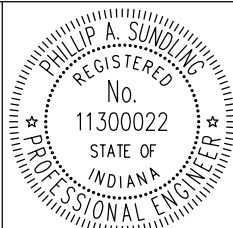


Catch Basin Boxout

1. All catch basins shall be separated from the pavement and curb by boxing out around basin as shown above. Expansion joint material shall extend completely through curb and slab. Manhole castings within the pavement limits shall be boxed in like manner except when telescoping-type castings are used.
2. When a joint falls within 5 ft. of or contacts basins, manholes, or other structures, shorten one or more panels either side of opening to permit joint to fall on round structures and at or between corners of rectangular structures.

PCCP — STRUCTURE JOINTING DETAILS

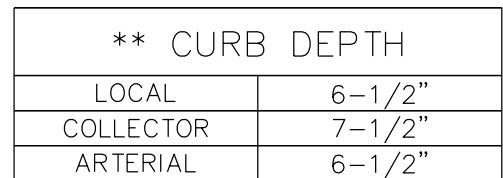
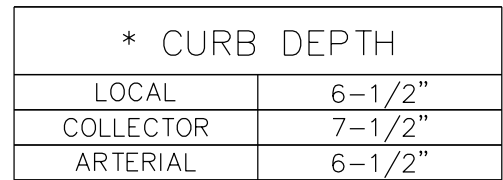
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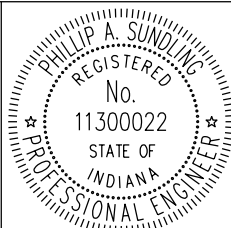
2/26/16
DATE


FIGURE 2500-006



All New Curb Tying Into Existing Curb Shall Be Pinned Per Westfield Standard and Specifications 2502-1.1F. No Backfilling, Paving, or Compaction Shall Be Done Until 72-Hours After Placement Of The Concrete Curbing.

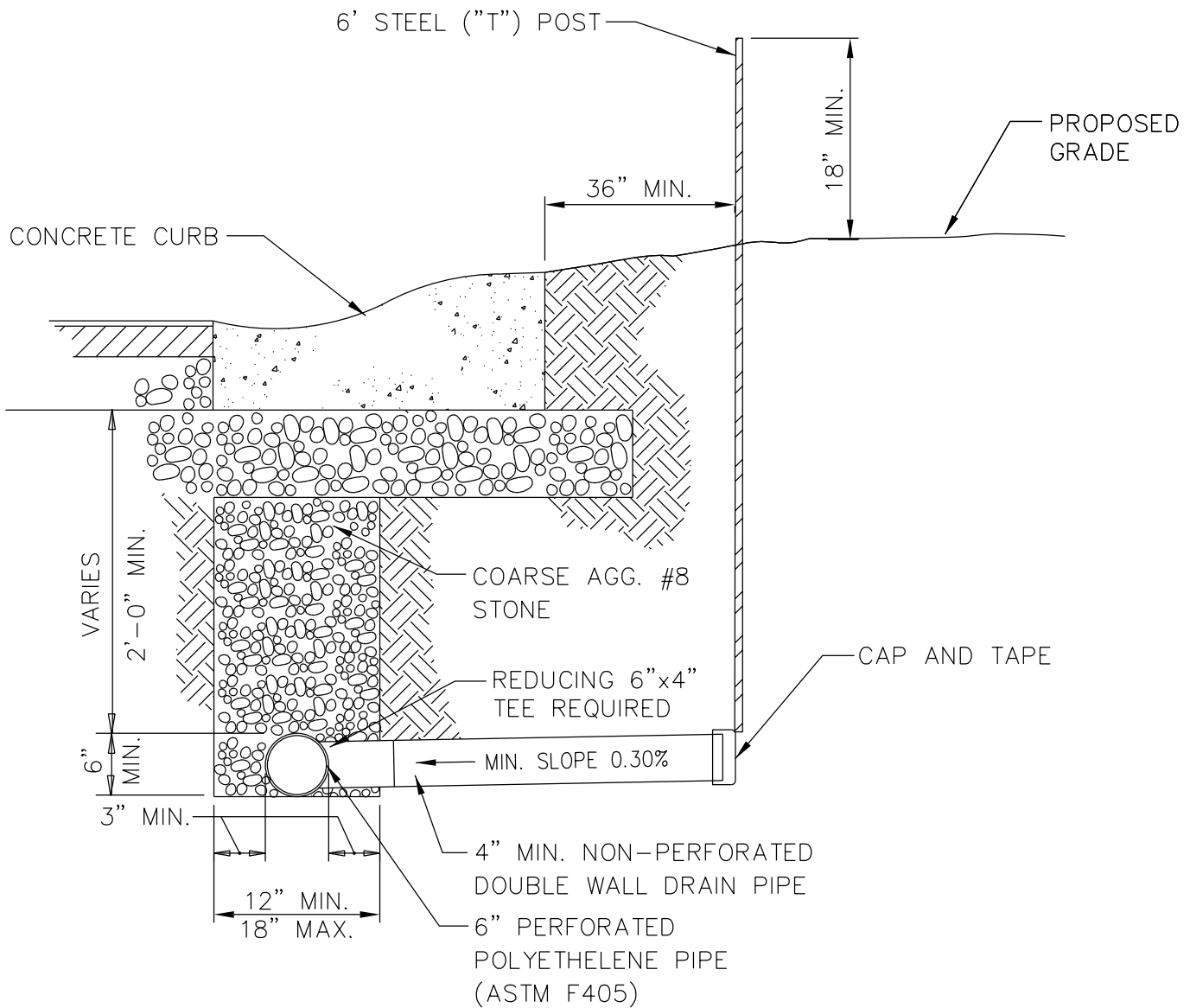
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DATE

FIGURE 2500-008

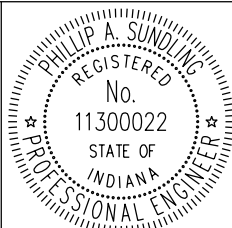


NOTES:

1. LATERAL LOCATIONS SHALL BE STAMPED ON CURB PER WESTFIELD STANDARDS AND SPECS 2502-1.1F
2. MATERIALS AND INSTALLATION IN ACCORDANCE WITH INDOTSS 718.

UNDERDRAIN DETAILS

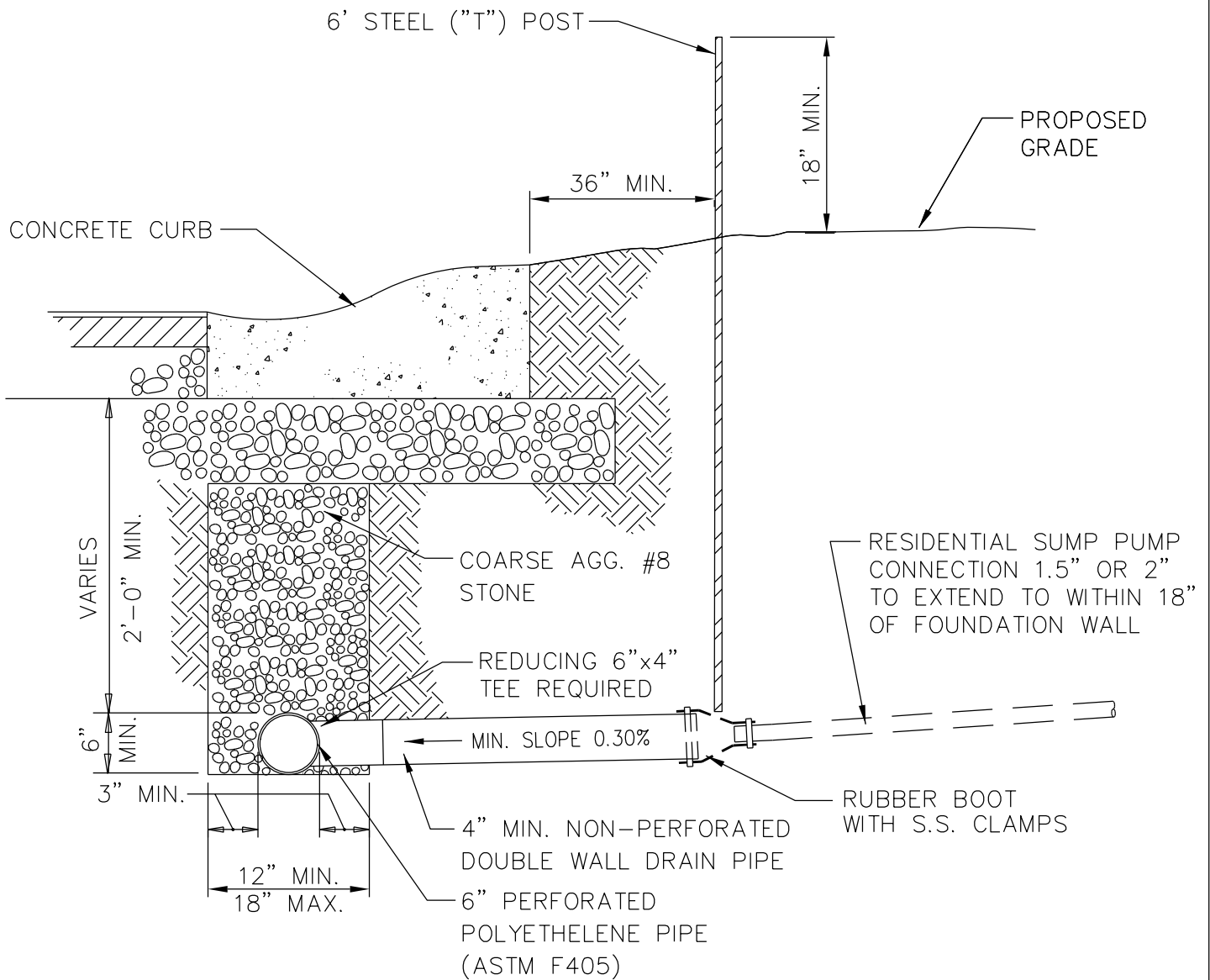
CITY OF WESTFIELD, INDIANA



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2/26/16
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FIGURE 2500-009

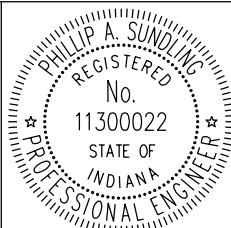


NOTES:

1. LATERAL LOCATIONS SHALL BE STAMPED ON CURB PER WESTFIELD STANDARDS AND SPECS 2502-1.1F
2. MATERIALS AND INSTALLATION IN ACCORDANCE WITH INDOTSS 718.

UNDERDRAIN DETAILS

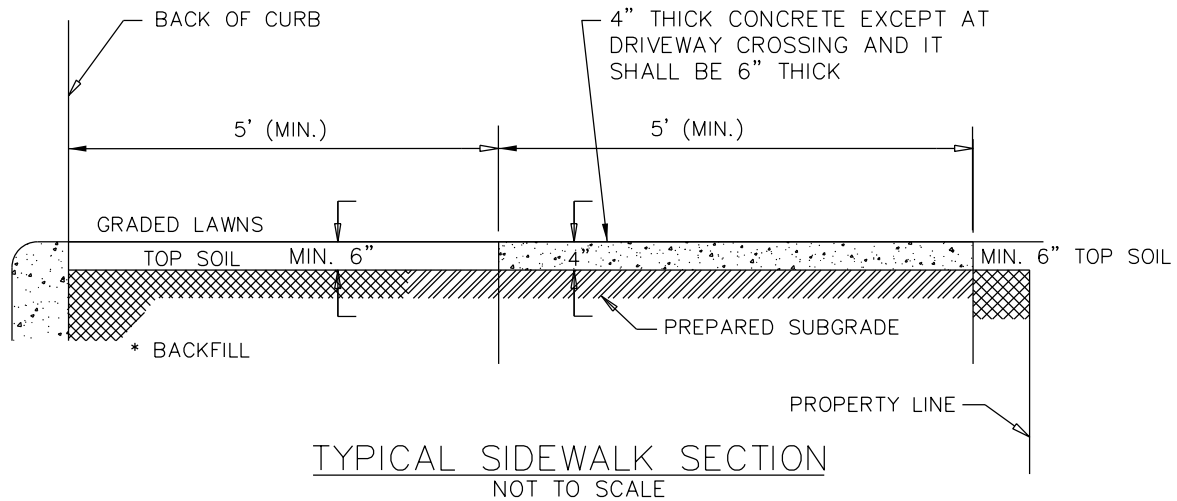
CITY OF WESTFIELD, INDIANA



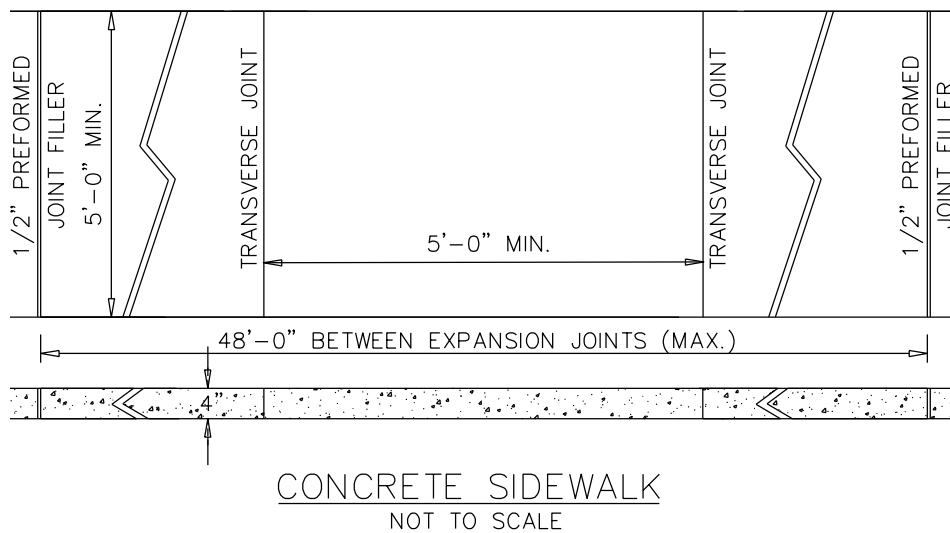
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FIGURE 2500-009a



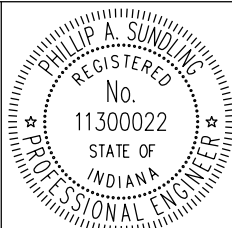
* THE SPACE BEHIND THE CURB SHALL BE FILLED WITH SUITABLE MATERIAL TO THE REQUIRED ELEVATION AND COMPACTED IN LAYERS NOT TO EXCEED 6" IN DEPTH.



NOTES:

SUBGRADE UNDER ALL CURBS, SIDEWALKS, AND DRIVES SHALL BE COMPACTED IN ACCORDANCE WITH INDOTSS 604.

SIDEWALK DETAILS



CITY OF WESTFIELD, INDIANA

Phillip A. Sunding

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DATE

FIGURE 2500-010

SIDEWALK CURB RAMP NOTES

THE CITY OF WESTFIELD FOLLOWS THE INDOT GUIDELINES FOR SIDEWALK RAMPS.
THE LIST OF DETAILS BELOW CAN BE FOUND ON THE INDOT WEBSITE:

<http://www.in.gov/dot/div/contracts/standards/drawings/>

See INDOT Std. Dwgs. E 604-SWCR For Additional Details

Curb Ramps Shall NOT Be Permitted Within The Limits Of A Driveway

SIDEWALK CURB RAMP NOTES

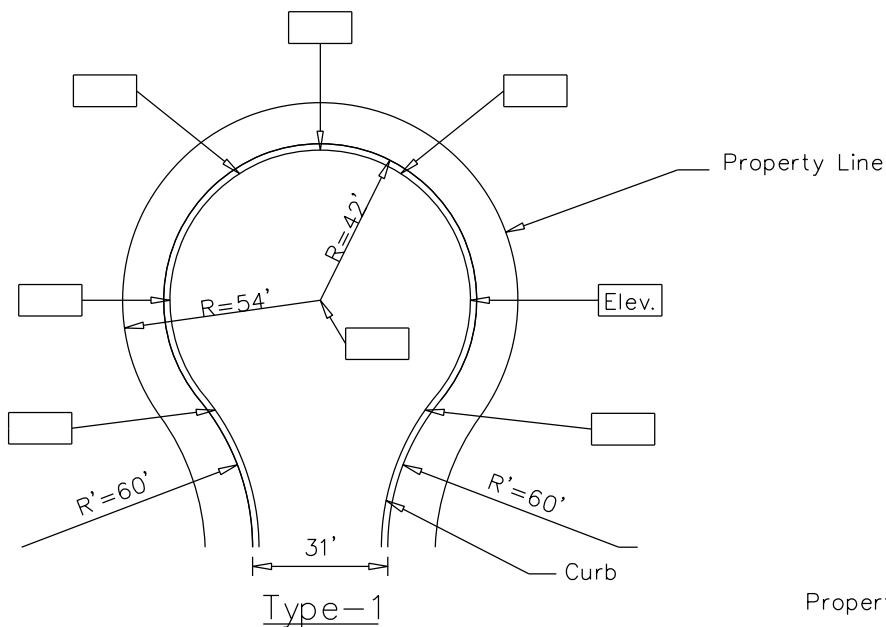
CITY OF WESTFIELD, INDIANA



A handwritten signature in black ink, appearing to read "Philip A. Sundling".

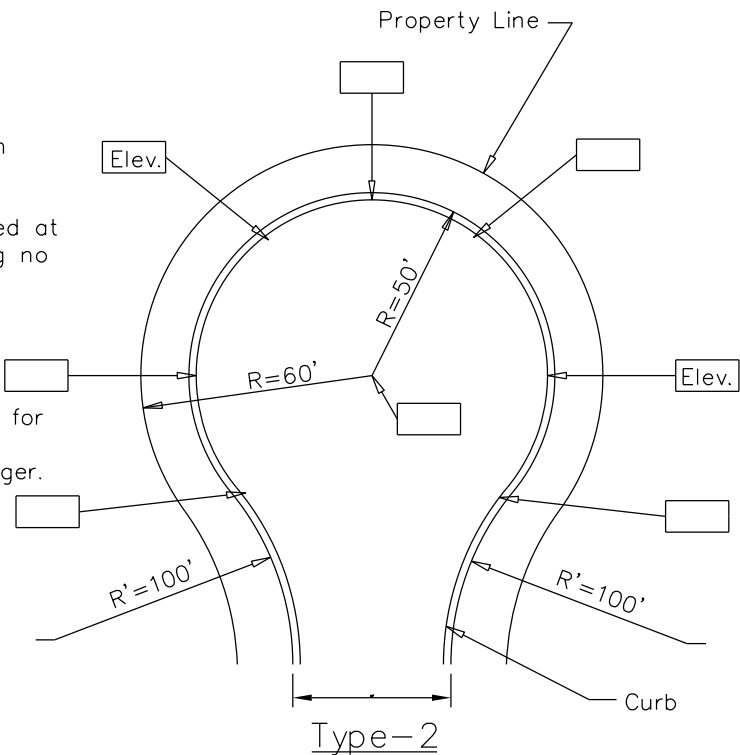
2/26/16
DATE

FIGURE 2500-011



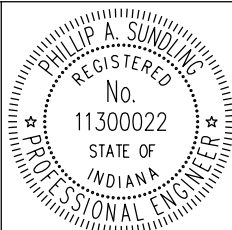
GENERAL NOTES:

1. Type-1 shall be used only in Local subdivisions; all other use Type-2.
2. Warning signs shall be posted at entrance to street, indicating no outlet.
3. Detail shall be identified by street name.
4. Elevations provided shall be proposed flow line of gutter.
5. One detail shall be provided for each cul-de-sac.
6. Scale shall be 1"=40' or larger.
7. Cul-de-sac length shall be a maximum of 600 feet, see section 02501 of the standard specification



CUL-DE-SAC DETAILS

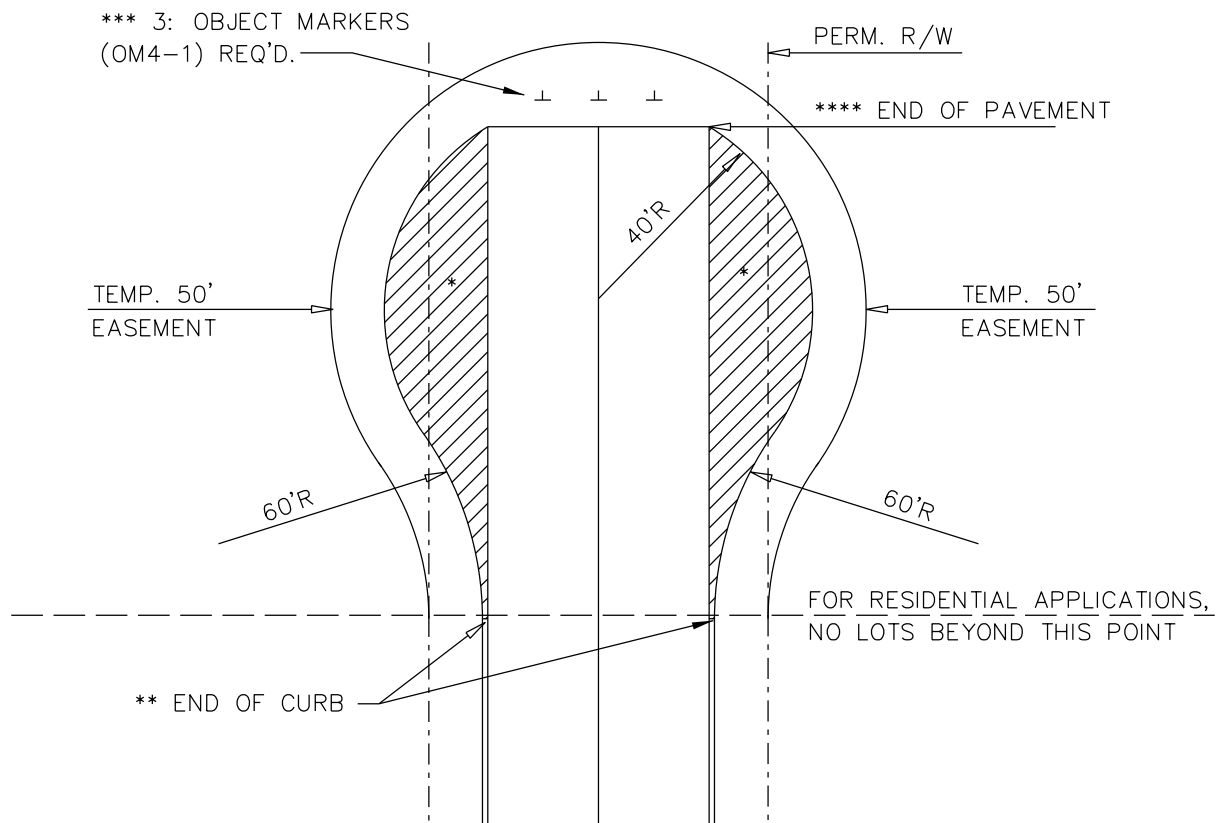
CITY OF WESTFIELD, INDIANA



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FIGURE 2500-012

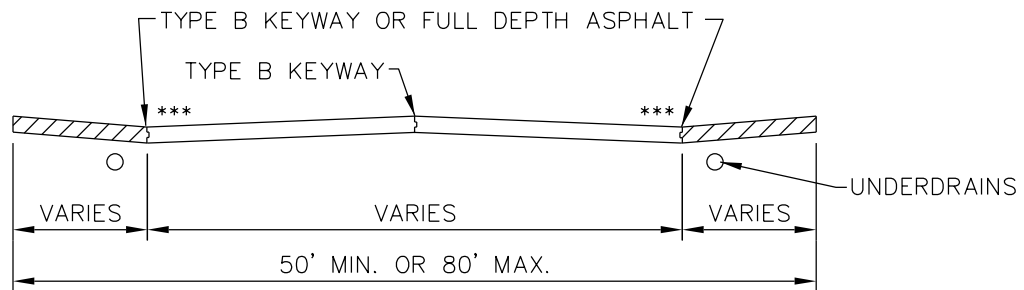


* TO BE REMOVED WHEN THE STREET IS CONTINUED.
THICKNESS AND TYPE TO MATCH PERMANENT PAVEMENT.

** DEVELOPER MAY EXTEND CURB TO END OF PAVEMENT.

*** FOR ADDITIONAL OBJECT MARKER DETAILS, SEE FIGURE 2500-014.

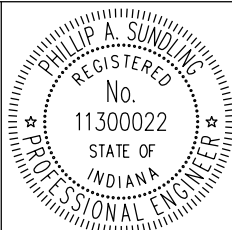
**** UTILITIES SHALL BE EXTENDED TO END OF PERMANENT PAVEMENT LIMITS



NOT TO SCALE

TEMPORARY CUL-DE-SAC DETAILS

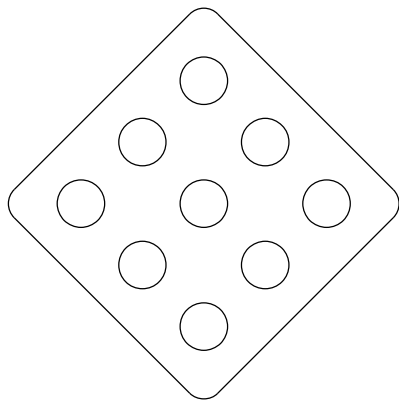
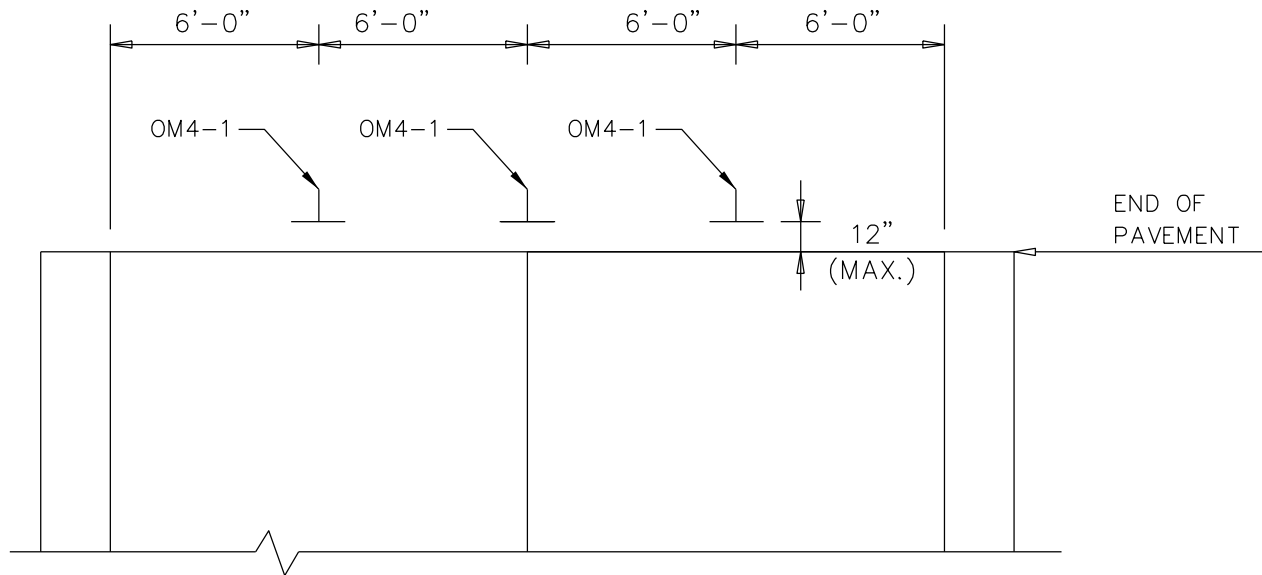
CITY OF WESTFIELD, INDIANA



Phillip A. Sundling

2/26/16
DATE

FIGURE 2500-013



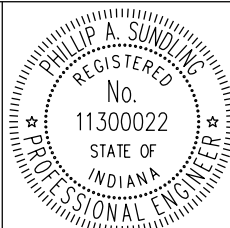
OBJECT MARKERS (OM4-1)
 SIZE: 18" x 18"
 COLOR: RED ON RED
 MOUNTING HEIGHT: 4'-0" MEASURED FROM
 TOP OF PAVEMENT TO BOTTOM OF SIGN

NOTES:

For Additional Details, See MUTCD, Latest Version, 2C.66.

END OF ROADWAY DETAILS

CITY OF WESTFIELD, INDIANA



Philip A. Sundling

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 DATE

FIGURE 2500-014

High Intensity, Prismatic Reflective Sheeting

INDOT Standard Specifications (2014)
Section 913 Miscellaneous. 919.01 (3a) Traffic signs reflective Sheeting, Encapsulated Lens.

MATERIAL: Traffic Signs fabricated from 3-M (or other INDOT approved) reflective sheeting,
High Intensity, Prismatic ASTM Type IV on aluminum backing

3930 - White (INDOT approval #W088801)
3932 - Red (INDOT approval #W088803)
3935 - Blue (INDOT approval #W088804)
3939 - Brown (INDOT approval #W128801)

3931 - Yellow (INDOT approval #W088802)
3934 - Orange (INDOT approval #W058802)
3937 - Green (INDOT approval #W058805)

Diamond Grade Reflective Sheeting

INDOT Standard Specifications (2014)
Section 919 - Traffic Signs: 919.01 (3a) Traffic signs reflective Sheeting, Encapsulated Lens

MATERIAL: Traffic Signs fabricated from 3-M (or other INDOT approved) reflective sheeting,
Diamond grade ASTM Type IX on aluminum backing

4084 - Fluorescent Orange (INDOT Approval # W068893)
4091 - Yellow (INDOT Approval # W088891)
4095 - Blue (INDOT Approval # W088893)

4090 - White (INDOT Approval # W088890)
4092 - Red (INDOT Approval # W088892)
4096 - Worboy Green (INDOT Approval #W088894)
4097 - Green (INDOT Approval # W088895)

MATERIAL: Traffic Signs fabricated from 3-M reflective sheeting, Diamond grade ASTM Type XI on aluminum backing

4081 - Fluorescent Yellow (INDOT Approval # W088896)
4083 - Fluorescent Yellow/Green (INDOT Approval # W088897)

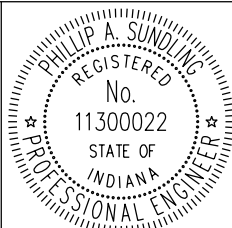
Aluminum Backing Material

INDOT Standard Specifications (2014)
Section 919 - Street Signs: 919.01 (a) Traffic Signs Sheet Signs

GENERAL STREET NAME SIGN NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE FINAL STREET SIGN LEGEND AND BACKGROUND COLOR WITH THE CITY BEFORE ORDERING AND INSTALLING STREET NAME SIGNS.
2. STREET NAME SIGNS WILL MEET THE MINIMUM STANDARDS SPECIFIED IN THE INDIANA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE FEDERAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES UNLESS OTHERWISE STATED.
3. ALUMINUM BACKING MATERIAL WILL COMPLY WITH INDOT STANDARD SPECIFICATIONS (2014) SECTION 919 - STREET SIGNS: 919.01 (a) TRAFFIC SIGNS SHEET SIGNS.
4. INSTALL GROUND-MOUNTED SIGNS PER STANDARD DWG RD-35 AND OVERHEAD SIGNS PER INDOT STANDARD DWGS.
5. LONGER SIGN LENGTHS WILL REQUIRE SPECIAL SIGN SUPPORTS AND APPROVAL BY THE CITY ENGINEER

STREET SIGNS – MATERIAL DETAILS

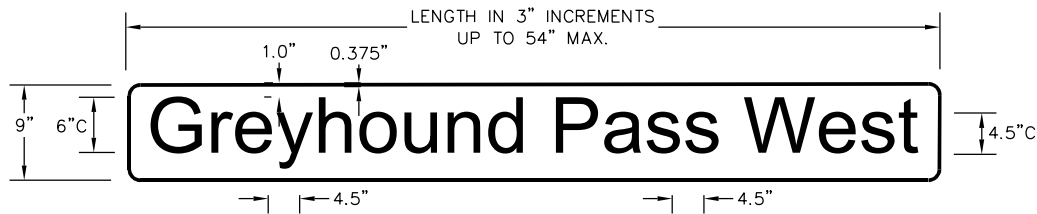


CITY OF WESTFIELD, INDIANA

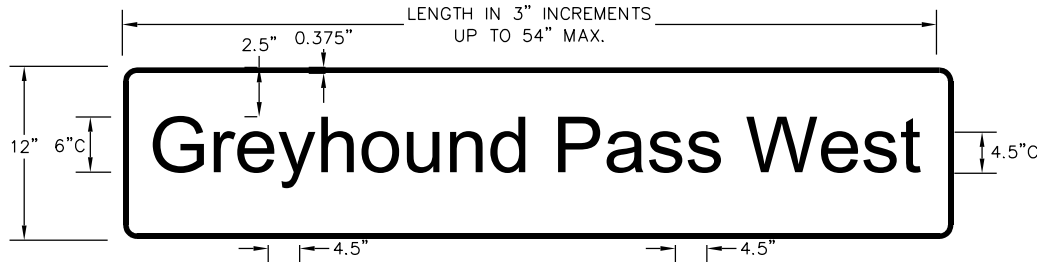
A handwritten signature in black ink, appearing to read "P. Sundling".

2/26/16
DATE

FIGURE 2500-015a



**Subdivisions & Local Roads
with Speeds 25mph or Less**



**Collector and Arterial Streets with
Speeds Greater Than 25mph**

High Intensity, Prismatic Reflective Sheeting

INDOT Standard Specifications (2014)

Section 919 - Traffic Signs: 919.01 (3a) Traffic Signs Reflective Sheeting, Encapsulated Lens.

MATERIAL: Traffic Signs fabricated from 3-M (or other INDOT approved) reflective sheeting,
High Intensity, Prismatic ASTM Type IV on aluminum backing

3930 - White (INDOT approval #W088801)
3935 - Blue (INDOT approval #W088804)
3939 - Brown (INDOT approval #W128801)

3932 - Red (INDOT approval #W088803)
3937 - Green (INDOT approval #W058805)

GENERAL STREET NAME SIGN NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THE FINAL STREET SIGN LEGEND AND BACKGROUND COLOR WITH THE CITY BEFORE ORDERING AND INSTALLING STREET NAME SIGNS.
2. STREET NAME SIGNS WILL MEET THE MINIMUM STANDARDS SPECIFIED IN THE INDIANA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE FEDERAL MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES UNLESS OTHERWISE STATED.
3. ALUMINUM BACKING MATERIAL WILL COMPLY WITH INDOT STANDARD SPECIFICATIONS (2014) SECTION 919 - STREET SIGNS: 919.01 (a) TRAFFIC SIGNS SHEET SIGNS.
4. INSTALL GROUND-MOUNTED SIGNS PER STANDARD DWG RD-35 AND OVERHEAD SIGNS PER INDOT STANDARD DWGS.
5. LONGER SIGN LENGTHS WILL REQUIRE SPECIAL SIGN SUPPORTS AND APPROVAL BY THE CITY ENGINEER

STREET SIGNS – NAME DETAILS

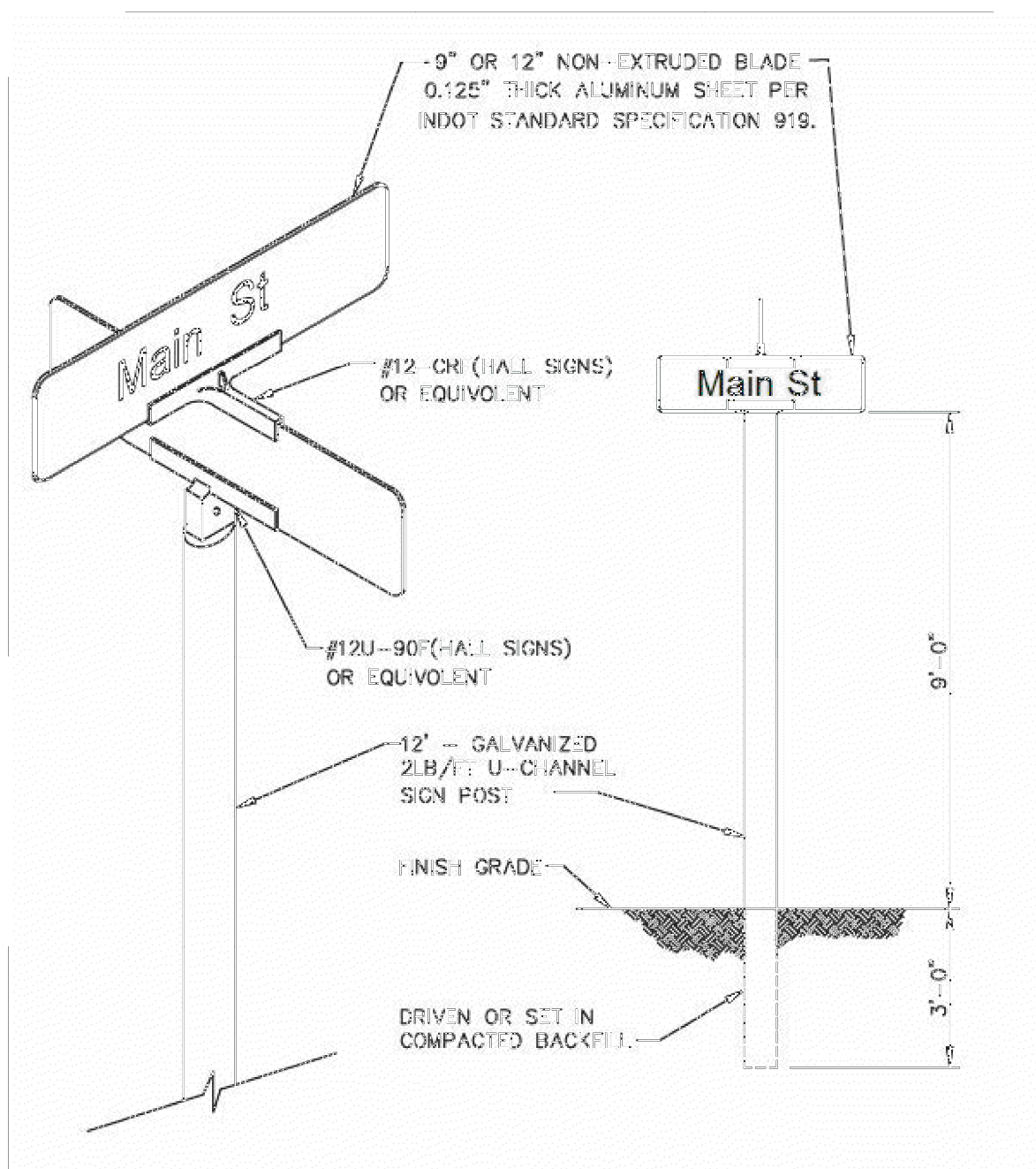


CITY OF WESTFIELD, INDIANA

Phillip A. Sundling

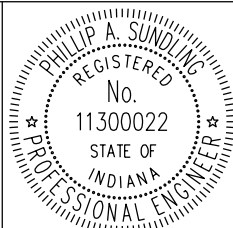
2/26/16
DATE

FIGURE 2500-015b



STREET SIGNS – SIGN DETAILS

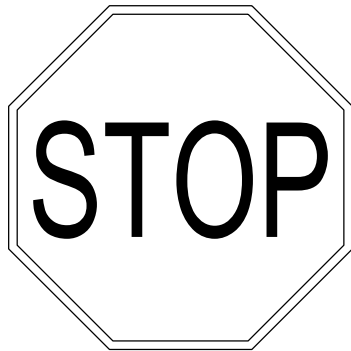
CITY OF WESTFIELD, INDIANA



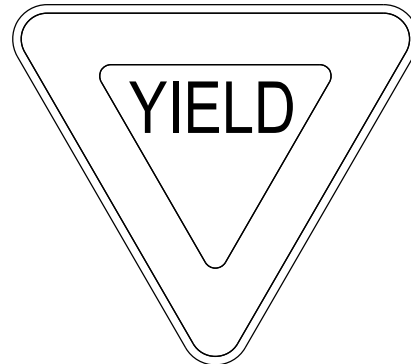
Philip A. Sundling

2/26/16
DATE

FIGURE 2500-015c



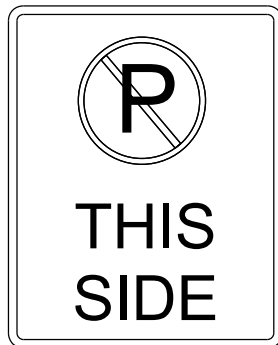
STOP SIGN (R1-1)
30" x 30"



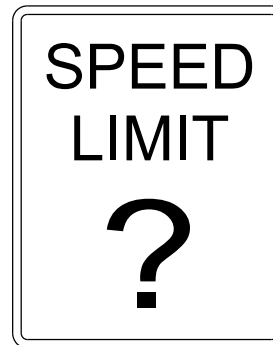
YIELD SIGN (R1-2)
30" x 30" x 30"



R1-4
18" x 6"



NO PARKING SIGN (R7-31)
12" x 18"



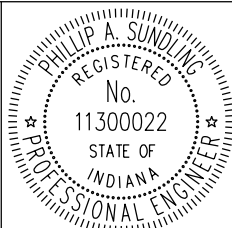
SPEED LIMIT SIGN (R2-1)
24" x 30"

NOTES:

- 1.SIGNS SHALL BE SINGLE FACED WITH HIGH INTENSITY REFLECTORIZED SHEETING ON 0.080" THICK ALUMINUM SHEET MATERIAL PER INDOT STANDARD SPECIFICATION 919.
- 2.POSTS SHALL BE 12'-0" LONG, 2lb/ft GALVANIZED U-CHANNEL SIGN POST INDOT STANDARD SPECIFICATION 910.14.
- 3.ALL SIGNS, 36" AND GREATER, SHALL BE; DOUBLE POSTED, 14'-0" LONG, 3lb/ft GALVENIZED U-CHANNEL POST, PER INDOT STANDARD SPECIFICATION 910.14.
- 4.ALL SIGN SIZES, SHAPES, COLORS AND MATERIAL SHALL MEET THE INDIANA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

STREET SIGNS – SIGN DETAILS

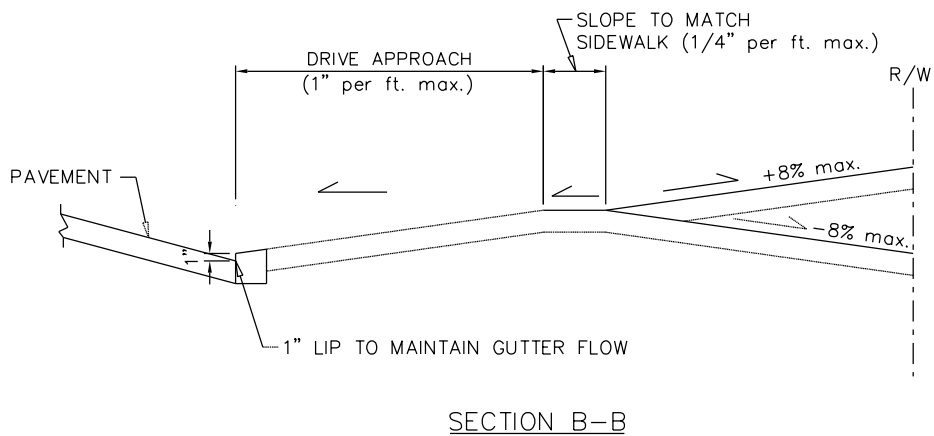
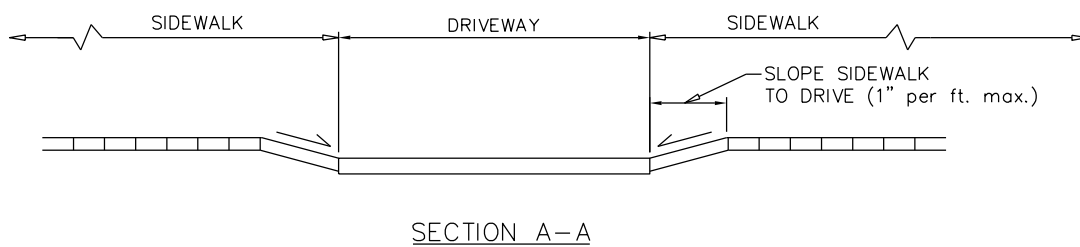
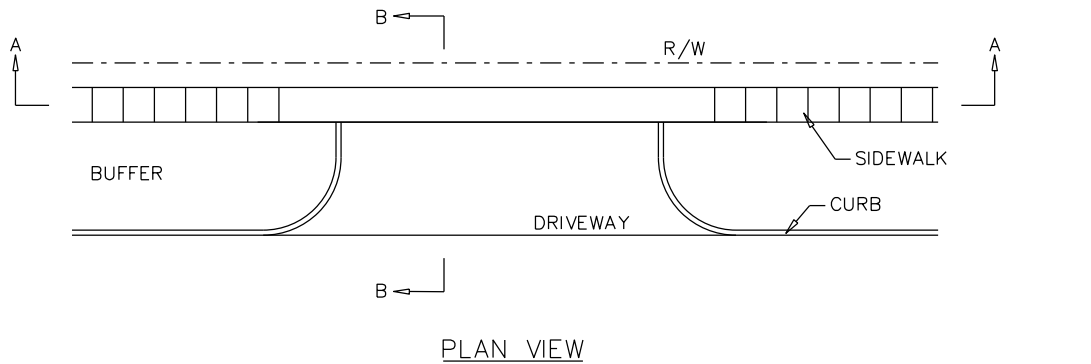
CITY OF WESTFIELD, INDIANA



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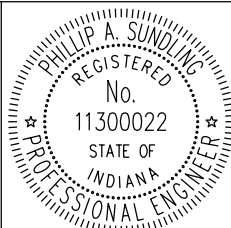
2/26/16
DATE

FIGURE 2500-015d



TYPICAL DRIVEWAY SECTION

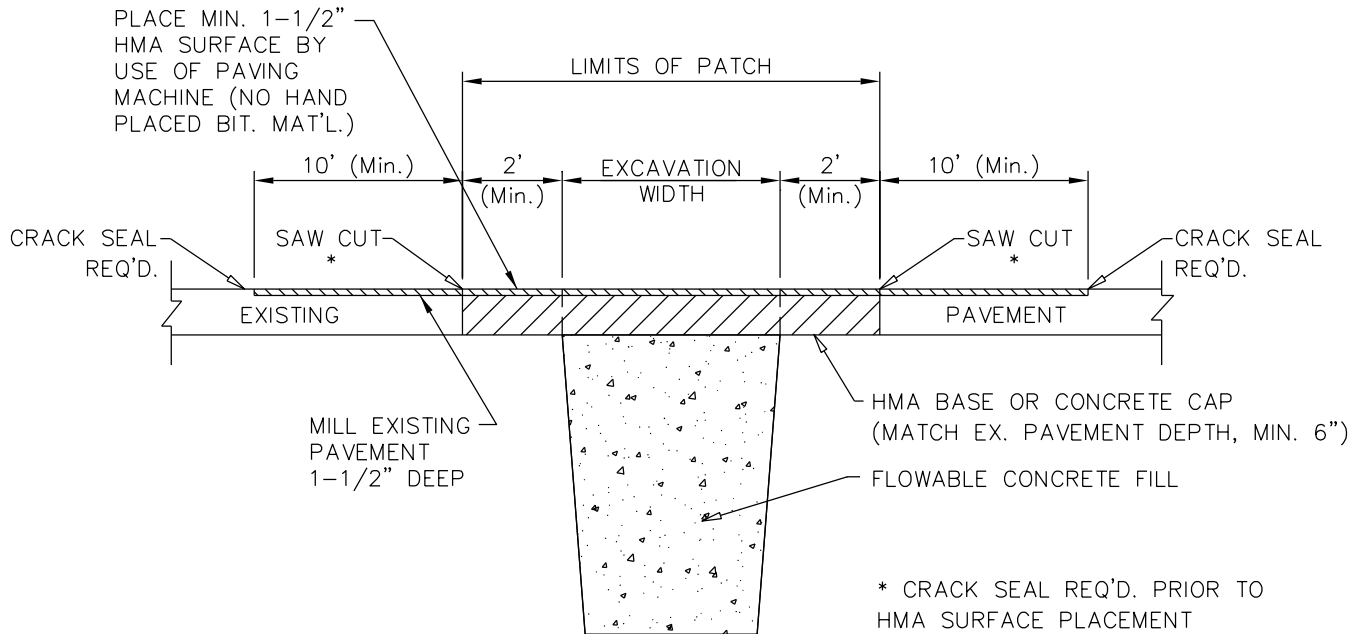
CITY OF WESTFIELD, INDIANA



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FIGURE 2500-017

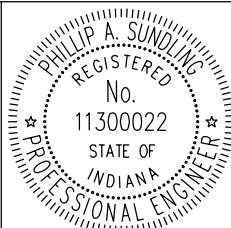


NOTES:

HMA Type To Be Determined By WPWD Engineer.
HMA Base Lift Shall Not Exceed 6".

PAVEMENT PATCHING DETAILS

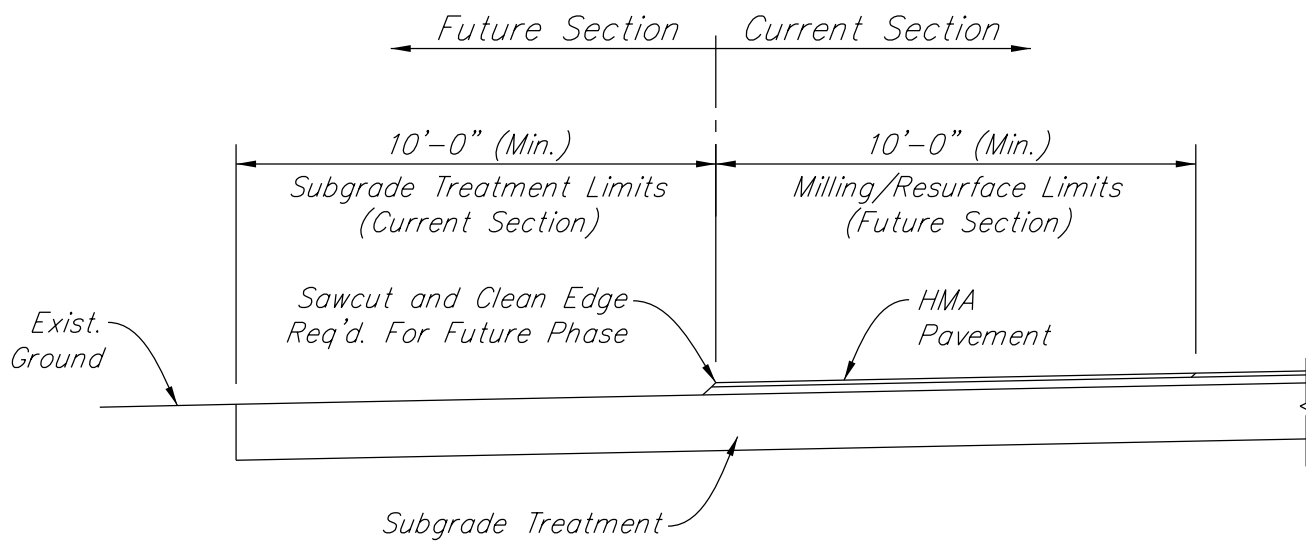
CITY OF WESTFIELD, INDIANA



Phillip A. Sundling

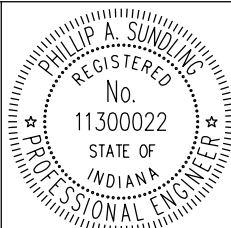
2/26/16
DATE

FIGURE 2500-019



PAVING DETAILS — NEW RESIDENTIAL SECTIONS

CITY OF WESTFIELD, INDIANA



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2/26/16
DATE

FIGURE 2500-020